



Caltrans Division of Research,
Innovation and System Information

Research Results

Transportation
Safety and
Mobility

DECEMBER 2013

Project Title:
Augmented Speed Enforcement

Task Number: 2146

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Product Category: New tool and
equipment

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Slowing Down Vehicles in Rural Work Zones

*Portable speed-enforcement system detects and warns
speeding vehicles using license plate identification*

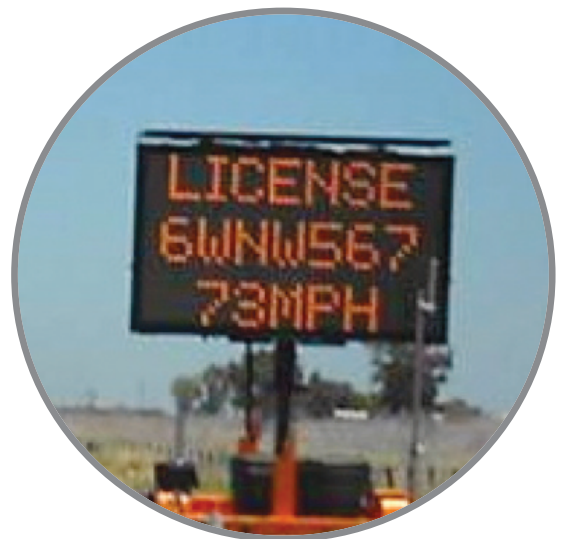
WHAT WAS THE NEED?

Although fewer vehicle miles are traveled in rural areas than urban areas, rural areas have approximately 42% more fatal collisions. Speeding and other aggressive behaviors are primary contributing factors. Studies have shown that higher collision rates occur at highway locations that temporarily set lower speed limits, such as work zones. Work zone collision rates are especially high on rural two-lane, two-way highways. To address this issue, Caltrans proposed an innovative safety program that is consistent with the objectives of the U.S Department of Transportation Research and Innovative Technology Administration to reduce speed-related collisions with coordinated speed management systems.

WHAT WAS OUR GOAL?

The goal was to develop a practical method to lower vehicle speeds in rural work zones to provide a safer environment for workers and the traveling public and reduce the number and severity of collisions.

*The vehicle's license
plate and speed are
displayed on the changeable
message sign.*



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California's transportation system.

WHAT DID WE DO?

Caltrans, in partnership with the University of California, Berkeley Partners for Advanced Transportation Technology (PATH) program, developed and implemented a speed enforcement system that includes a radar system that detects vehicle speed, a camera system that captures a photograph of the vehicle and its license number, a changeable message sign (CMS) to post advisories, a portable display device for CHP officers, and wireless communication links that use dedicated short-range communication (DSRC) and cellular networks. DSRC and cellular communication links are required to transmit the data to the CMS, officers, and a central server.

The system works as follows:

- The radar detects a vehicle's speed, the camera captures a photograph, and automatic license plate number recognition is performed.
- The vehicle's speed and license plate number are transmitted through a DSRC link and displayed on the portable CMS that is placed about 1,000 feet ahead, advising the driver to reduce speed if over the speed limit threshold. The personalized message, which includes the vehicle license number, encourages the driver to observe the speed limit in the work zone.
- The data, including the speed, license plate number, and photograph, are also transmitted via a cellular connection to a back-end server. Enforcement officers in the vicinity of the work zone can access the data with any standard web browser.
- The data is stored and archived on the back-end server. The back-end server allows remote monitoring and diagnosis of the operational status of the speed camera.



WHAT WAS THE OUTCOME?

The field tests showed that the system reduced the number of vehicles traveling over 65 mph in the work zone by 6.1%, relative to baseline conditions. The system tested was a prototype and provided a successful proof of concept. Further development is needed to harden and develop the system so that maintenance staff in the field would be able to use it.

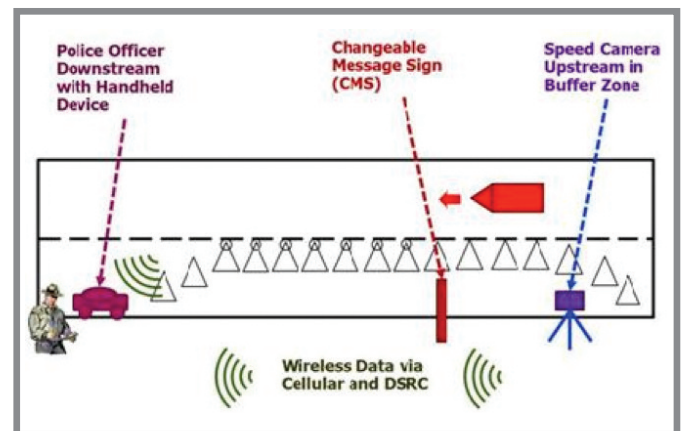
WHAT IS THE BENEFIT?

Rural areas often have fewer operators to help control traffic speed in work zones and must instead rely on signage and other methods to slow motorists down. Displaying the motorist's license plate number and speed through personal messaging encourages the driver to reduce the speed, making the work zone area safer.

LEARN MORE

The final report will be available early 2014 at:

www.dot.ca.gov/research/researchreports/dri_reports.htm



Speed-enforcement system captures a vehicle's license plate and speed to provide the driver a directed message on the CMS to slow down in the work zone.